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ABSTRACT

Because low-achieving second-grade students were not motivated to acquire math skills, a teacher employed at a large, inner-city elementary school with a black student population implemented a practicum aiming to improve acquisition of mathematics skills. Major causes of the problem were the lack of manipulative materials for concept development, inflexible and inappropriate teaching styles, lack of practical application of math skills, and inadequate allocation of time for instruction in mathematics. Practicum goals were to: (1) increase students' interest level; (2) increase students' application of skills; (3) use students' increased interest and application to develop their self-direction; and (4) improve students' performance of on-task duties. The intervention program: (1) provided learning materials with many examples and demonstrations; (2) informed students of what they would be doing and why; (3) allocated time for exploration, discovery, and small group problem solving; (4) related mathematics concepts to everyday experiences; (5) planned numerous activities focusing on the applicability of mathematics to everyday experiences; and (6) positively reinforced student participation. Evaluation data indicated that the intervention increased students' interest and application skills, developed student self-direction, and improved student performance in mathematics activities. Related materials are appended. (RH)

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Improving the Performance of Second Grade Students in Math By Increasing Interest, Motivation, and Application to Everyday Experiences

by

Milicent D. Russell

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NOVA UNIVERSITY

Improving the Performance of Second Grade Students in Math By Increasing Interest, Motivation, and Application to Everyday Experiences

by

Milicent D. Russell

Cluster XXIV

A Practicum I Report Presented to the Ed.D. Program

in Early and Middle Childhood

in Partial Fulfillment of the Requirements

for the Degree of Doctor of Education

NOVA UNIVERSITY

1988

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PRACTICUM APPROVAL SHEET

This practicum took place as described.

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Approved:

3/21/88

Date of Final Approval of Report

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ABSTRACT

Improving the Performance of Second Grade Students by Increasing Interest, Motivation, and Application to Everyday Experiences. Russell, Milicent D., 1988: Practicum Report, Nova University, Ed.D. Program in Early and Middle Childhood. Descriptors: Time-on-Task/Primary Education/Mathematics/Elementary Education/Student Motivation/Classroom Management/Time Management/Teacher Effectiveness/Student Behavior/Attention

This practicum addressed the problem of second grade students' lack of interest and motivation to learn math skills. This lack of interest resulted in students not spending enough time performing the on task duties necessary for math skill development. The writer's goals were: (1) to increase the interest of the students; (2) to increase the application skills of the second grade students to everyday experiences; (3) to develop the students' self direction; and (4) to improve student performance in math.

The writer administered a teacher survey and determined that students were not interested in math because they lacked understanding of concepts and the necessary skills to apply math to everyday experiences. Math was also considered boring by the students. The writer planned a math program that was abundant in examples and demonstrations; informed students of what they would be doing and why; allocated time for exploration/discovery and small group problem solving; related math concepts to everyday experiences; planned numerous activities which focused on the applicability of math to these experiences; and encouraged students to participate through the use of positive reinforcements.

The results of this practicum were positive. Analysis of the data revealed that this math program increased interest and application skills, developed student self direction, and improved student performance in math activities.

Chapter 1

Introduction

Description of Community

The community in which the writer is employed is very old and has experienced many changes. Once a prominent and very stable area, the community now mainly consists of families in low and lower-middle socioeconomic stratems. Though the community is comprised predominantly of single family homes, it is not uncommon, in particular areas, to have two or three families occupying one home. These areas are quite transient.

The community has many churches, a community hospital, a large public library, a shopping area, many small food franchises, and a park. There are few affordable activities available to the youths of the community.

Writer's Work Setting and Role

The writer works in a large, inner-city elementary school. The student population of 1,137 is 100% Black. The school has two buildings. The primary building houses grades one through three. The main building houses two preschool programs, one Headstart program, four kindergarten classes, and grades four through

eight.

The school is located in a lower socioeconomic environment. The vast majority of the students, 85%, come from families eligible for government programs, such as free breakfasts and lunches. This eligibility is determined by the established criteria of governmental organizations.

The city's Board of Education establishes the standards and policies for the educational system. Actual implementation is carried out by principals of each school under the supervision of administrators in the district offices. Local School Improvement Councils have come into more control within recent years. These councils must be apprised of the school budget by March of every year and must approve of the proposed budget.

The philosophy of the school stresses motivation, adequate time and practice, and pupil satisfaction. Teachers provide a caring and challenging atmosphere. Students are exposed to varied experiences to maximize effective learning. Parents are invited to participate in school activities in efforts to unite students, parents, and teachers.

The administration consists of one principal and two assistant principals. The assistants are housed in each of the school's two buildings. The full and half-time

guidance counselors share responsibilities. The reading resource teacher works with all students and teachers. Services are also provided by members of the ancillary staff which includes a speech therapist, social worker, school nurse, and truant officer.

The faculty is composed of 43 teachers. All are assigned according to their area of certification. There are 9 males and 34 females on the faculty. Of this number, 11 are Caucasian and 32 are Black. Thirty-six of the teachers have taught ten years or more and seven have taught three to nine years. Nineteen teachers hold a master's degree or higher.

Academic classes are grouped heterogenously. The program for all students includes reading and skill development, English grammar and composition, spelling, writing, math, social studies, general science, music, art, library science, physical education, and health and safety. The teachers of grades one through six provide instruction in all academic areas with the exclusion of library science and physical education. Grades seven and eight are departmentalized as mandated by the city's Board of Education. Teachers in these grades are responsible for reading instruction in their assigned homerooms and instruction in one other subject area at their particular grade level.

Special programs include a computer lab for grades six through eight, five self-contained Chapter 1, federally funded classrooms, and five self- contained Chapter 1, state funded classrooms. These classrooms service students in grades one through five who are a year or more below grade level in reading and/or math. Placement is determined by the Iowa Test of Basic Skills. The school also has two federally funded pull-out programs for students in grades six through eight who are below level in reading skills. Programs are offered to those with learning disabilities through the two Moderate to Severe Learning Disability classes and the Severe Learning Disability class. Speech therapy and guidance and counseling are available to students upon teacher recommendation.

The writer is a teacher who has worked with children in the primary grades for 16 years. Many of these years were with below average students. The writer holds an undergraduate degree in kindergarten-primary education and a master's degree in administration and supervision. The writer is certified through the state Board of Education in elementary teaching, kindergarten through grade nine. She is also state certified in administration and supervision, kindergarten through grade twelve. The writer is certified by the city's

Board of Education in primary education and intermediate/upper education. She served as acting assistant principal in the primary department for one year.

The writer has been at the present work location for six years. She is currently a second grade teacher in a self-contained, federally funded program for low achieving students.

Chapter II

Study of the Problem

Problem Description

Primary students had little interest in math and lacked the motivation to learn math skills. This lack of interest and motivation resulted in students not spending enough time performing the on task duties necessary for math skill development. These duties include listening, reading, math computation, and math problem solving.

An overview chart and a time distribution sheet, supplied by the city's Board of Education, specifies math objectives to be taught at each grade level and the total amount of time, per week, to be allocated for math. Activities, bulletin boards, topics for discussion, and games are suggested in the teacher manuals to introduce and reinforce concepts being presented. Each teacher is able to choose a time block for math which will not interfere with the scheduling of library and physical education classes. The method of teaching math concepts is also the decision of each teacher.

Math instruction by most of the primary teachers involved verbal directions and examples at the

chalkboard. Students were then allowed to solve problems at the board, followed by individual seatwork activities in the workbook.

The writer noted that objectives presented on the overview chart were not adhered to. Teachers, instead, began at the front of the math book and worked through each page, even though students had mastered the skill. As a result, math books were seldom completed by the end of the year and many objectives were left untaught. The suggestions offered in the teacher manuals were not employed in most classrooms. These observations were the result of numerous discussions with primary teachers over a period of many years.

This style of teaching led to teachers and students experiencing many difficulties. Students lacked interest and motivation. They did not readily participate in oral discussions or question and answer periods. Students did not ask questions when they were uncertain of a problem, nor did they volunteer answers when they understood. Teachers constantly encouraged students to stay on task during seatwork activities, tests, and work with manipulatives. Students and teachers became easily frustrated.

Another difficulty was that students had no concrete examples in which to relate math. Math concepts were

too abstract and difficult to grasp. Students could not determine the importance or necessity of learning math.

A third difficulty encountered by teachers and students was poor performance on tests. Students who lacked interest and motivation, were passive participants, and who could not ascertain the relevancy of a subject naturally received lower grades on tests. Skills had to be retaught and tests readministered. This was time consuming, frustrating to teachers and students, and, more often than not, a fruitless effort.

The final difficulty was that students had no self-direction. This fact was displayed in numerous ways. Students did not work well individually, and not at all in small groups. Teachers had stated to the writer in informal discussions that they never had small group activities. Students did not use manipulatives for the intended purposes. Teachers had to constantly encourage students to complete activities. Students seldom asked for help, and did not understand math clearly enough to know exactly when they needed assistance. Students could not solve problems independently.

The problem had not been solved because too few activities were provided for the students. The students were not exposed to practical means of relating math to

everyday situations. The students were not interested or motivated because they were not exposed to various activities and teaching styles.

Briefly stated then, the problem addressed by the practicum was the lack of student interest, motivation, and ability to relate math to everyday situations. This lack was shown by the poor performance of the on task duties
necessary for math skill development.

Problem Documentation

The writer solicited the cooperation of the primary teachers of the school at which she is employed. A survey was given to each teacher. Each teacher was requested to anwer questions as they applied to her math class. Fiften surveys were distributed and 12 were returned. This represented a return rate of 80%.

Six of the seven questions were open-ended and the last was answered on a continuum. A sample survey is provided in Appendix A. Results of the survey are also presented in Appendix A.

The first statement of the survey asked teachers to provide reasons for student inattentiveness during math. Each teacher gave a mimimum of two reasons. Of these, the response given most often, 9 times out of 25, was

lack of understanding of basic concepts. The second reason, given seven times, was lack of interest. The fact that students could not relate math to anything was stated by five teachers. The next response, given by two teachers, indicated that math was not presented in a fun way. The least given reasons, each stated by one teacher, were that students did not like math and were not physically involved.

The second question asked teachers how often hands-on experiences were provided to the students. Seven of the twelve teachers indicated that they provided hands-on experiences daily. Two teachers provided it once a week. One teacher provided hands-on experiences three times a week, another made provisions twice, and another teacher provided it only during the first ten weeks of school.

Teachers were next asked to list the difficulties encountered in providing hands-on experiences to their students. Of the 34 responses, the lack of manipulatives was cited most often, eight times. The difficulties cited next, each representing five of the responses, were lack of time and outside interruptions. Class size and the fact that manipulatives were too easily lost or destroyed were other concerns expressed by the teachers. These two reasons totaled 8 of the 34

responses. The necessity of individualized instruction on their use, discipline problems, students not using the manipulatives for the intended purposes, and dependency on manipulatives each accounted for two responses.

When teachers were asked to list the manipulatives they had in their classrooms, all teachers had counters for addition and subtraction skills and number recognition. This was the only manipulative in four of the classrooms. Half of the teachers had an abacus and at least one clock for the purpose of demonstration. Four teachers had rulers, two teachers had flash cards, and one teacher had either a magnetic board, felt board, geometric shapes, toy money, cups and spoons, or number lines. Teachers with manipulatives other than counters and/or an abacus stressed that they themselves had either made or purchased items for the students in their classrooms. Four of the teachers who stated that they used manipulatives daily had only counters in their rooms. When asked by the writer about this discrepancy, they replied that number recognition, addition, and subtraction facts were basically the only concepts taught throughout the year. Of the manipulatives available, all teachers had enough counters for individual students, but needed more of the others for

individual and small group activities.

Teachers were requested to list two math skills and effective methods of teaching those skills. Nine teachers stated addition and/or subtraction as the math skill. The methods of teaching this concept were through the use of counters or the chalkboard. Other skills and teaching methods cited were oral drill put to the beat of popular songs, multiplication tables taught through the use of rays, and place value taught through role-playing.

In response to student attentiveness during teacher presentation, eight of the teachers answered that students were only moderately attentive and four answered very attentive. The teachers who answered very attentive stated that they have students arranged in a semi-circle or that they sang, danced, or did anything necessary to keep students interested. Five of the teachers replied that their students were very attentive when using the manipulatives, six teachers said students were moderately attentive, and one teacher noted that students were not attentive at all. Students who were very attentive often took this opportunity for play time and did not use the manipulatives for their intended purposes. One teacher stated that her students were very attentive during question and answer periods.

Eight teachers responded that students were moderately attentive, and three teachers noted that students were not attentive at all. For seatwork activities, one of the teachers had students who were very attentive, six teachers had students who were moderately attentive, and five teachers had students who were not attentive at all. Classes were evenly divided during oral drill. Six teachers responded that their class was very attentive and six responded that their class was moderately attentive. During tests, one teacher stated that the class was very attentive, while 11 of the teachers indicated that their class was only moderately attentive.

A Student Interest Survey (see Appendix B) was administered to the thirteen second grade students in the writer's class. This survey measured the level of interest in mathematics. The survey, composed of seven questions, has three possible answers for each question. The answers are rated on a scale of three, representing high interest, two, representing little interest, and one, which represented no interest in math. The class average of 1.878 indicated a low interest. Responses given by the majority of the students will be explained for each question. Results of the survey are included in Appendix C.

Questions one and two asked the students if they liked math, and how math made them feel. Eight of the students indicated that they liked math a little and that math made them feel happy most of the time. In response to the question "Do you ask questions during math," eight students responded that they never asked questions. Eleven students stated that they liked for the teacher to ask them questions sometimes. However, these students only wanted to be asked questions when they were positive of the correct answer and offered to volunteer their information. They did not want the teacher to ask them questions if their hands were not raised. Under these same conditions, the majority of students responded that they enjoyed working at the chalkboard.

Ten students believed that their math work was too difficult. These students expressed that they did not understand the concepts, nor did they understand why they had to learn math.

The majority of the students enjoyed using manipulatives. When asked to explain their responses, these students indicated that this was an opportunity to play and talk.

The results of the survey confirmed the fact that students lacked the interest and motivation to succeed

in math. The majority of students did not ask questions when concepts were unclear, and those who did understand, were reluctant to volunteer information. Many students expressed that math was too difficult for them.

The Student's Questionnaire, "How Do We Use Math In Everyday Situations," (see Appendix D) determined the students' awareness of the applicability of math. Students were to give examples of how five concepts, addition and subtraction, money, measurement, distance, and time are used in everyday, practical situations. The purpose of the questionnaire was to ascertain the students' concepts of how and why math is important. Results are included in Appendix E.

Of the four possible reasons for using addition and subtraction in everyday situations, only one correct answer, counting, was given. This response was given by two of the thirteen students.

The three correct responses for how money is used in everyday situations were given. Twelve of the students responded that money was used for shopping, one student stated the importance of coin and dollar recognition, and two students responded that money can be saved.

When asked how measurement is used everyday, one student answered that measurement was used in building

homes. Three students stated that size was determined from measurements. No student responded that measurement was used for cooking, drawing or sewing.

The fourth concept was that of distance. Students were asked how distance, blocks and miles, was used in practical situations. None of the thirteen students was aware of the concept of distance or why it was important.

The final concept, time, elicited the most responses. Three students responded that time was important for knowing when to wake up and when to go to sleep. Two students stated that people eat meals at special times. Ten of the thirteen students answered that time was important for keeping appointments, and two students said that school started at a certain time.

A total of 20 responses was possible for the Student Questionnaire. No student was able to give more than five correct answers. These results indicated that students were not told why they were learning specific concepts, why these concepts were important, or how they could be used outside the classroom. This lack of knowledge contributed to the students' poor performance and motivation.

The Survey of Student's Self Direction, Appendix F,

measured ability to work independently and in groups, know how and when to use manipulatives, know when to ask questions or ask for assistance, solve problems or know the steps to undertake, and complete activities. The survey was composed of 14 statements answered on a continuum of one to five. One meant the student never did what the particular statement was measuring and five meant always.

The survey was completed for each child at the end of the first week of school. Mean scores ranged from a low of .071, indicating no self direction, to 4.0, indicating a high level of self direction. The results of the survey are included in Appendix G.

Causative Analysis

The problem had four major causes. One cause was the lack of manipulatives for concrete understanding of math concepts. Five of the twelve teachers had only counters and an abacus available to them. These teachers did not buy manipulatives for classroom use, nor did they make any for the students. Students did not have hands-on experiences that kept them interested and motivated.

A second major cause of this problem was teaching style. Teachers were not aware of the importance of

altering their current teaching style or were unwilling to change. Teachers, in general, followed the same format: introduction of the skill, demonstration at the board, class activity at the board, and individual paper and pencil seatwork activities. No time was allotted for individual or small group investigation or activities. Visual aides, such as filmstrips, overhead projectors, transparencies, bulletin boards, and games were seldom, if ever, used.

The third cause was the lack of practical application of math skills in relation to everyday situations. Teachers did not discuss in enough detail or provide enough varied experiences so that students would understand why math is important and how we use it every day.

Lack of time was the final cause. Teachers did not allot time throughout the school year to cover math concepts other than number recognition, addition, subtraction, multiplication, and time.

The Related Literature

A review of the related literature revealed that interest, motivation, and the amount of time spent on task is positively associated with academic achievement. Many methods were suggested which could be beneficial in

improving interest and performance of students.

Seifert and Beck (1984) stated that the responsibility for improving attention and performance of students is shared by principals and teachers. Principals should reduce intercom messages, limit the number of personal interruptions by aides, secretaries, and students, and reduce student absentees by vigorously pursuing students with less than desirable attendance. Teachers should establish academic achievement as an important goal in the classroom. Seifert and Beck found that seatwork assignments add to off task behavior and must be closely monitored by teachers.

Punnet (1986) found that the performance of students who were given a specific goal was far greater than that of those students who were told to do their best. The result of Punnet's study suggests that teachers should establish academic achievement as an important academic goal.

Byrd, Copenhaven, McIntyre, and Norris (1984) and McIntyre, Copenhaven, Byrd, and Norris (1983) reported that the most frequent on task activities in math are writing and listening to the teacher. The major classroom activity is seatwork. McDaniel (1986) and Calvin, Lowe, and Clanton (1986) suggested techniques of keeping students on task during seatwork assignments.

McDaniel stated that use of the focusing principle led to better learning. This principle requires the teacher to request, demand, expect, and wait for student's attention before giving instructions or presenting materials. Assignment, directions, and time constraint should be stated clearly. Calvin et al. stated that to keep a constant check on student performance during seatwork assignments, it is necessary for the teacher to circulate around the room frequently and make personal contact.

Wheldall, Bevan, and Shortall (1986) list four types of touching behavior which increases performance of students. These touches are friendly, helpful, attentional, and incidental.

Wang (1979) recognized the constraints on teacher time and the limited alternatives in allocating this time to carry out required instructional and management tasks. To effectively use instructional and learning time, Wang believes that children should be their own manager of time and should be responsible for managing the classroom learning environment. According to her management system, students as young as four years of age can be trained to become effective classroom managers.

Yatvin (1980) discussed many techniques in which the

student becomes an effective classroom manager. The use of several learning centers with self-teaching and self-correcting materials was suggested for additional learning activities. Other suggestions included peer tutoring and pupil-led small groups.

In contrast to studies by Wang (1979) and Yatvin (1980), in which the performance increased as students became managers of their own time, Rosenshine (1978) reported the on task performance of students decreased. Classrooms with students who chose their own activities were characterized by rowdiness, shouting, noise, and disorderliness. The need for adult monitoring and supervising of student activities in primary rooms was stressed. Sindelar and Gartland (1984) conducted a study to test an implication that within a lesson, the more time students spend in teacher-led activities, the greater will be their interest and achievement. They found that sutdents who received 75% teacher instruction and 25% seatwork activities were more attentive, achieved higher test scores, and remained on task longer than students who received less teacher instruction. Corby (1982) noted that positive behavior and performance increased as teachers spent more noninstructional time supervising the students.

Dyerson (1980) asserts that unsupervised activities,

such as independent seatwork and learning centers are time consumers. He found that among those activities which consume the most time are transition, discipline problems, lengthy explanations because of unclear tasks, and inappropriate tasks in which the students lack the skills.

Davidson (1980) indicated that waiting time during transition negatively affects children causing boredom and anxiety. Davidson maintains that teachers should be very organized to move smoothly from one subject to the next.

Arlin (1989) stressed the importance of a smooth time flow. Transitions should be structured to maintain students' interest and reduce opportunity for disruptive behavior.

Davidson and Powell (1986) observed that children who do not pay attention during the teaching of a concept only partially learn the concept or do not learn it at all. This causes the teacher to spend additional instructional time. Davidson and Powell found that the use of easy listening background music was effective in inreasing the performance of children in elementary science classrooms. They suggested that providing easy listening music in the classroom would be a plausible, inexpensive method for increasing on task performance.

Lane and Pearson (1982) noted the developmental differences in distractibility could result from a tendency of young children to use up some of their attentional capacity in the processing of irrelevant information. Yatvin (1980) suggested giving instructions and explanations for seatwork only to the children who are going to use them. Formats for worksheets and workbook pages should be limited. Formats should be taught thoroughly at the beginning of the year.

Petosa and Oldfield (1985) assessed the impact of stress management techniques on elementary school children's on task behavior in the classroom. Petosa and Oldfield suggested that stress management skills should be considered as an adjunct to more traditional approaches of enhancing attentional behaviors in the classroom. They noted that teaching children psychophysiological relaxation skills is easily integrated into existing curriculum through health and science and does not have the implementation problems inherent in behavior modification strategies.

Anderson (1981) determined that the attention of primary students in a learning activity increases when they are involved to give active, individual respones. Anderson suggested that if contributions are regularly

solicited and required from all students, attentiveness will be greater. Anderson noted three signal systems that are associated with student involvement. These systems include continuity, insulation (the protection from distraction), and intrusiveness (the potential for materials to stimulate inappropriate behaviors). Students exhibit higher levels of attentiveness in lessons characterized by a higher degree of continuity, greater insulation, and less intrusiveness. Anderson stated that teachers can arrange the classroom environment to make attention more likely.

Rosenfield, Lambert, and Black (1985) reported the effects of desk arrangements on performance. Desks arranged in circles produce a greater number of on task, out of order comments, on task oral responses, and on task behaviors than did rows. The cluster arrangement produces a greater number of on task behaviors and more hand raising than did rows. Row arrangement produces a greater amount of withdrawal responses than did circles or clusters and more off task responses than circles. Rosenfield suggested that to facilitate pupil interaction during discussion sessions, desks should be arranged in circles.

Youssef (1984) indicated that for many students, motivation and study time have a positive effect on

academic achievement. For those students in which motivation and study time did not help them achieve, Youssef stated that the students might have felt the assignments were either too easy or difficult and therefore were not motivated.

McNamara (1981) determined that inattentiveness and low test scores were both associated with failure of the teacher to provide work of a suitable level of difficulty. McNamara stressed the importance of teachers to examine the content of instruction and match work to students' capabilities.

Tobin and Capie (1981) and Gettinger and Lyon (1983) expressed the belief that the student's locus of control, the tendency for the individual to accept responsibility for academic sucess or failure, influences the student's on task performance. Those students with an internal locus of control exhibit a higher rate of interest and success.

Witt and Hannafin (1983) found that the use of a home-based academic reinforcement program produced lower levels of inappropriate behavior and higher levels of academic performance. Parents were asked to provide praise, privileges, and encouragement for items completed correctly and for improvement over time. The program was simple and required no alterations in normal

teaching and classroom activities.

Gettinger (1985) evaluated the extent to which spending less time engaged in learning than needed affected overall learning and retention of material. Gettinger stated the need for students to spend adequate time in learning as well as the need for teachers to allocate adequate time in order to maximize achievement. Spending less time than needed results in a lower degree of learning and lower retention of material one week later.

Lyon (1984) examined the learning rate differences on tasks requiring knowledge, comprehension, and application. Results of the study indicated that most students master knowledge tasks, the direct recall or recognition of factual materials, at a much faster rate than those tasks involving comprehension, the translation of material from one form to another, and application, the identification and selection of appropriate pieces of information needed to solve new problems. Lyon asserts that students need more time to attain mastery of school learning. The increased time should be spent on teaching the strategies needed for acquiring comprehension and application skills.

Dyerson (1980) made a number of suggestions to increase the time to teach. Teachers should adopt

direct teaching techniques for basic skills instruction. They should make sure students know the goal of instruction, guide students into recall of previously learned skills, and demonstrate new information. Teachers should also increase the amount of student responding, maintain an orderly classroom with an academic focus, select tasks that students need, schedule an uninterrupted time for basic skill learning, and review all objectives to see if they are critical to acquiring the skill and are appropriately sequenced.

Stallings, Robbins, Presbrey, and Scott (1986) expressed the belief that teachers using the Madeline Hunter Model of Instruction improved on task performance. The Madeline Hunter Model of Instruction lists specific techniques for task analysis, increasing time management, teaching to the left and right brain, increasing student motivation, teaching thinking skills, teaching for memory, and teaching for transfer.

Lienhardt (1986) studied the arithmetic teaching of expert elementary school teachers. These experts were exceptionally good at constructing series of lessons that successfully transmitted the content that needed to be learned. Their lessons were clear and accurate. New material was presented within a coherent, but flexible lesson structure.

Expert teachers managed instructional time ensuring that almost all of the time allotted for math was used on math. They structured the environment to expand opportunities for learning by increasing performance time and coverage of lessons.

Burns (1986) stated that elementary grade children spend an estimated 90% of their school mathematics time on paper and pencil computation practice, most often learning computation skills by rote. Though students learn the rules and are able to do computations, they lack understanding and reasoning skills. Burns believes that teaching priorities and procedures must change. As students understand the reason why, they become increasingly successful in their new learning and increasingly motivated by their own success.

Simon (1986) found that in order to survive in math courses, students compensate for their lack of understanding by memorizing mathematical procedures and formulas. Teachers are increasingly adopting two teaching strategies: the exploration/discovery approach and the use of pair and group problem solving to address this problem. The exploration/discovery strategy provides students with the opportunity to do rather than passively learn. The pair and small group problem solving strategy exposes students to diverse thinking

and problem-solving approaches and develops awareness of the student's own cognitive processes.

In conclusion, a review of the related literature showed the importance on task performance has on academic achievement. Numerous suggestions, which can be easily adapted by teachers, were found in the literature. Teachers who strive to improve performance of students will benefit in many areas, including time and classroom management, and most importantly, the academic achievement of students.

Chapter III

Anticipated Outcomes and Evaluation of Instruments

Statement of General Goals

Students' performance of on task duties is necessary for math skill development. Performance is dependent upon interest, motivation, and application of skills to everyday experiences. The first goal of this practicum was to increase the interest level of the writer's second grade students. The second goal was to increase the students' application of skills. The third goal was to use the students' increased interest in math and application of skills to develop self-direction. The final goal of this practicum was to improve students' performance of on task duties.

Behavioral Expectations

The writer chose the first two behavioral objectives based upon results of the Teacher Survey and an analysis of the literature. The third and fourth behavioral objectives were chosen to measure the third and fourth goals of this practicum as stated in the previous section. Therefore, the following specific behavioral objectives were chosen for this practicum.

1. Over a period of 12 weeks, second grade students will increase their interest in math, as measured by a ten percent increase in the average score of the class on a teacher-made interest survey, to be given at the beginning and end of the implementation period.

2. Over a period of 12 weeks, second grade students will relate math to everyday experiences, as measured by writing 15 of 20 examples on a teacher-made questionnaire, to be given at the beginning and end of the implementation period.

3. Over a period of 12 weeks, second grade students will develop self-direction, as measured by a ten per cent increase in the average score of the class on a teacher-made survey, to be given at the beginning and end of the implementation period.

4. Over a period of 12 weeks, 75% of the second grade students will participate in 20 of the 25 math activities as measured by a teacher-made activities checklist.

Evaluation Instruments

The first objective was to be measured by a teacher-made rating scale (see Appendix B), containing seven questions relating to the student's interest in math. The survey was to be completed by each student at the beginning and end of the implementation period. Students who were not exposed to numerous concepts and a

variety of experiences would most likely have a very low level of interest. This should result in a low rating on the scale when in it is given before implementation. However, at the end of the implementation period, these students would have been exposed to many concepts and experiences which would actively involve them in learning and increase their interest. This would result in a higher post-implementation rating.

The second objective was to be measured by a teacher-made questionnaire (see Appendix D) completed by each student at the beginning and end of the implementation period. Given a math concept, students were to write examples of how it is applied to everyday situations. The questionnaire, in single column format, is easy for primary students to understand and complete. Students exposed to varied activities related to each math concept were expected to write more examples of how math is used in everyday situations at the post-implementation period.

The third objective was to be measured by a teacher-made rated survey (see Appendix F) containing 14 statements relating to the student's self-direction. The survey was to be completed at the end of the first and twelfth weeks of the implementation period by the writer. Statements chosen for this survey determined

the student's ability to work independently and in small groups, select and properly use the correct manipulatives, know when to ask for assistance and state the specific problem, pace through and complete assignments, and apply previous experiences to new situations.

The fourth objective was to be measured by a teacher-made activities checklist (see Appendix H) for each student. Once a student had participated in a given activity, a parent volunteer and/or the writer would check off that activity. Specific activities were to be repeated daily during the teaching of a concept to give students ample opportunity to participate. Participation, for most activities, would be easy to observe and remember because the imformation or completed products were to be collected and/or put on display in the classroom. This would make it simple to maintain an accurate account of each student's participation.

Chapter IV

Solution Strategy

Discussion and Evaluation of Possible Solutions

A review of the literature disclosed many methods which math teachers could easily adapt to meet the needs of their students. The problem encountered with such a wide variety of solutions was that teachers became overwhelmed and further frustrated. Though teachers are knowledgeable of many teaching strategies, genuine concerns, such as the lack of time and manipulatives, large class sizes, and students who lack interest and understanding, were constantly reiterated. The result was that the majority of primary teachers followed the same teaching technique and taught no more than two math concepts per year. A program that incorporated the solutions of other writers who faced the same problems needed to be implemented.

One possible solution to the lack of interest and motivation of students to perform math duties was the alteration of teacher preparation of lessons and teaching strategies. Davidson (1980), Dyer (1980), Corby (1982), Calvin et al. (1986), and McDaniel (1986) reported many advantages and successes in their studies.

They suggested that teachers should analyze and evaluate lessons and tasks carefully to select those which are interesting, relevant, appropriate, and varied so students will be motivated to engage in them. Lane and Pearson (1982), Leinhardt (1984), and Stallings et al. (1986) noted that materials should be examined thoroughly for the size of type, color of print, amount of information and the number of directions on worksheets. These factors can increase the distractibility of students. Seifert and Beck (1984) stated that teaching strategies should change three to four times in one period and teachers should actively involve students in learning from the beginning of class. Leinhardt (1984) found that expert math teachers present lessons which are filled with examples.

The second possible solution to the lack of interest and motivation of students in math was the use of environmental control. The principle of environmental control provides enrichment and stimulation to improve learning. Yatvin (1980), Calvin et al. (1986), and McDaniel (1986) suggested learning centers with self-teaching and self-correcting materials, bulletin boards, music, audiovisual aids, quiet times, quiet corners, and filmstrips as possible means of enrichment and stimulation. This soluton required planning to

ensure that materials were available either from the school, library, or home. The writer foresaw many benefits that could be derived from this solution.

The third possible solution to students' lack of interest and motivation was the use of positive reinforcements. Positive reinforcement motivates and raises the interest level of students. Calvin et al. (1986) and McDaniel (1986) included praises, nods, smiles, games, field trips, free time, food, and stickers among the most commonly used reinforcers. Calvin further expressed the need for teachers to make personal contact. Wheldall et al. (1986) studied the effects of touching behaviors on the performance of students and found it increased when teachers made personal contacts. Punnet (1986) found that goal setting works best when combined with rewards. This solution was not new and was being done by the teachers in the writer's work setting. The writer, from past experiences, had found this solution to be effective, inexpensive, and easy to incorporate in the classroom.

A fourth possible solution to students' lack of interest and motivation was involvement of parents. Results of a study by Witt and Hannafin (1983) showed that students increased interest, reduced inappropriate behavior, and raised their levels of academic

performance when a home-based reinforcement program was implemented.

These solutions are sound and feasible. They would be a creative teaching style because most of these strategies had not been used by the teachers in the writer's work setting. They could be easily adapted to the writer's targeted population of students and to the work setting. The one exception would be a home-based reinforcement program. Though parents would be asked to give praise and encouragement to their children in parent teacher discussions and through newsletters, time did not permit the writer to develop a program for this purpose. The solutions offered in the literature review would enable the writer to achieve the goal of increasing student interest as it is set forth in this practicum.

Another problem was the students' inability to relate math to everyday situations. Simon (1986) realized that students compensated for this lack of understanding by memorizing mathematical procedures. He advocated the exploration/discovery approach and the use of pair and small group problem solving. Both approaches are practical solutions that have proven to be effective in the study conducted by Simon. Arlin (1979) and Davidson (1980) believed that students should

be told what they will be doing next and what the goal of instruction is so they will have an understanding of why they are performing certain tasks.

The use of these approaches was critical to achieving the writer's goal. The students would be informed of what the goal was and why certain outcomes were expected. Math would become more meaningful to them.

The third problem, lack of students' self direction was studied by Wang (1979), Yatvin (1980), and Burns (1986). Wang and Yatvin believed that children should be managers of their own time and should be responsible for managing the classroom environment. According to Wang, students should be responsible for scheduling their time to complete all assigned tasks and some additional learning activities of their own choice within a given amount of time. They should be allowed to work on the tasks in any order they choose during the specified time period. Yatvin endorsed individual study programs in which students make their own work plan for a week.

These strategies, as they are presented, would not have worked in the writer's work setting because of mandates and requirements set forth by the city's Board of Education on curriculum policies and time allocation.

These strategies could, however, be revised to help the writer's targeted population of students improve their self-direction. The writer believed that tasks should be assigned and that students should learn to pace themselves to complete assigned tasks within given time constraints. Students would be more effective managers of time and more self-directed if they knew the daily routine, what they would be doing next and why, the format of worksheets and tests so they could begin work without asking questions, what materials to use and how to use them, when to ask questions or for assistance, and how to pursue appropriate activities if time permitted.

Another possible solution to students' lack of self-direction was to teach them what to do and why. Burns (1986) asserts that learning what math procedures mean makes them easier for students to remember. When students are told what to do and why, understanding and skills can be easily applied to new tasks.

This solution increases the students' self-direction by enabling them to transfer learning to new situations. This was an important goal of the writer and could be incorporated in the writer's work setting. Because the targeted population are low achievers, the use of this solution would provide added benefits. These students

would also become increasingly successful in their new learning. They would also become increasingly motivated by their own success as they began to understand why specific procedures were performed in arithmetic.

The final problem was that students did not participate in given activities. The writer believed that the solution to this problem was dependent upon the solutions of the aforementioned problems. However, the literature review did reveal one additional possible solution. Rosenfield et al. (1985) studied the effects of seating arrangements on student participation. They reported that the circle arrangement produced more oral responses. Rosenfield et al. suggested that to facilitate pupil interaction during discussion sessions, desks should be arranged in circles.

The classroom seating arrangement, in the writer's work setting, is mandated by administration in the district office. All teachers must use the cluster arrangement. Another difficulty seen in the different seating arrangement was that the writer must teach all subject areas and the changing of desk arrangements would be entirely too time consuming. This strategy would be more feasible in departmentalized classes or math labs. The writer did, however, use the circle arrangement for small group activities, manipulative

use, and learning centers, since the writer's classroom was equipped with two round tables.

Description of Selected Solution

The solution to the problem of second grade students lacking the interest, motivation, and skills to apply math to everyday experiences necessary to perform the on task duties of math skill developmemt was based on the strategies which were suggested and evaluated as possible solutions. The solution was to change the teaching style of the writer. This would be done through a combination and adaptation of these strategies to meet the needs, goals, and objectives of the writer (see Appendix J).

This solution was most appropriate because the current teaching styles, as determined from observations and informal discussions, were perpetuating the problem. The strategies suggested in the possible solutions addressed the problem situation, characteristics, and causes, which were explained in Chapter II.

To address the objective of the writer to increase interest and participation, the writer chose the following strategies: examination and evaluation of materials, presentations which were abundant in examples and demonstrations, environmental control, positive

reinforcement, active involvement of students from the beginning of class, and parent involvement. In addition, more time would be allocated for teacher instruction, small group activities, hands-on experiences, peer tutoring, and questions and answers.

Written materials for second grade students must be clear and concise. Young students become overwhelmed when presented with seatwork containing an abundance of information written in small print. Because of this, supplemental workbooks, covering the five areas of instruction, were examined by the writer to ensure that each was appropriate for the age and instructional level of the students. Specifically, the writer evaluated the size of type, amount of information on each given page, the number of directions, and the attractiveness. No one workbook satisfied the criterion for all five areas of instruction, therefore, worksheets were used from a combination of books in addition to being teacher-made.

Presentations by the writer were abundant in examples and demonstrations. Examples which drew upon previous experiences and learning of the students fulfilled three purposes. Students had a sense of belonging, became quickly interested, and remained attentive. Demonstrations which included pictures and/or concrete objects enabled students to grasp

concepts easily.

Measures were taken to enhance the environment of the classroom. One corner of the room was designated as the math center. This center included a round table, a seven foot bulletin board, and three shelves containing math supplies, equipment, and manipulatives. Students were free to sit at the round table, if time permitted, to partake in different activities. Games, play money, a calculator cash register, counters, an abacus, miniature clocks, measuring devices (including rulers, yard sticks, spoons, cup, pint, quart, half-gallon, and gallon containers) a bucket of water, self-teaching, and self-correcting worksheets were available. An instructional bulletin board was displayed for each area of instruction. These boards were also self-correcting. The shelves contained cassette tapes, a cassette recorder, filmstrips, and a Dukane machine. Students were taught how to operate and care for the equipment at the beginning of the school year. The tapes were used for drill and reinforcement purposes.

One of the characteristics of the writer's second grade, E.C.I.A. students was low self-esteem. These students who were at least one year below grade level, had encountered many experiences of failure. The writer, therefore, believed that the use of positive

reinforcements was critical to improving student interest and participation. Treats, such as candy, rings, small toys, erasers, and pencils were kept in a large treat box. Treats were given daily and students were allowed to make their own selection. The writer also used large, colorful stickers, coloring sheets, nods, smiles, touches, words of praise, applause, and an incentive chart. Other primary teachers and the administrators were invited in to offer praise and encouragement to the students.

Encouragement at home is as significant as encouragement at school. The writer employed strategies to keep parents well informed. Newsletters were sent to parents explaining class activities. Invitations were also extended for parents to participate in these activities at school and/or at home. Parents who were unable to visit the classroom were asked to offer encouragement and praise to their child, discuss class activities on a daily basis, and contribute recipes or treats for the students. Papers were sent home weekly for all parents to peruse, sign, and return. This strategy kept the parents knowledgeable of their child's activities and progress. Special smile-o-grams were printed for students to present to parents. These smile-o-grams were awarded to students who merited a

good grade on a test, were helpful tutors, displayed an enormous amount of enthusiasm, or volunteered information. The writer attempted to present at least one smile-o-gram each day. This strategy further motivated students to participate in activities. It also retained parent involvement since each smile-o-gram requested the parent to reward their child with a hug.

The final strategy to increase student interest and participation was to allocate more time for teacher instruction, small group activities, hands-on experiences, peer tutoring, and questions and answers. Because the writer is in a self-contained classroom and provides instruction in all curriculum areas, with the exception of physical education and library science, the allocation of more time for math was easily accomplished. Math time was increased by 15 minutes per day. Fortunately, the city and state Boards of Education also mandated that more time be expended for the purpose of math skill development.

The second goal of this practicum was to increase the students' application of math skills to everyday experiences. To satisfy this goal, the writer chose the following strategies: statement of the activity, reason for the activity, statement of the goal at the beginning of each class, allocation of time for small group

problem solving, and provisions for exploration and discovery.

A review of the literature indicated that students who were told what they would be doing next and what the goal of instruction was would have more meaningful experiences. The writer believed that students who were informed had a better understanding of why they were performing certain tasks and would thereby improve their reasoning skills. Each math concept was related to practical situations. Students discussed these situations and performed the related tasks. Students contributed information following each activity so that experience charts could be written and displayed in the room. The charts further reminded students of the applicability of skills in each area of instruction.

The math period was extended 15 minutes per day. This time was allocated for such hands-on experiences as group problem solving and exploration/discovery. The first strategy, group problem solving, was chosen because of its major benefits. It aided students in recognizing their own reasoning capabilities and that of others. Group problem solving exposed the more reserved student to varied methods of deriving an answer to a problem. Finally, it served as a form of peer-tutoring as each student in the group explained his/her special

technique in solving problems.

The exploration/discovery method removed the student from the role of passive learner and thrust him/her into a realm of activity. Students were more likely to remember and comprehend concepts if they were actively involved. They became more motivated as they realized that these enjoyable experiences contributed to their understanding and eventually to success.

The third goal, to increase students' self-direction, was satisfied as a result of goals one and two. The student who now knows what is expected, understands the reason for performing certain tasks, is able to relate concepts to everyday experiences, and is familiar with the daily routine is more likely to become more independent. Therefore, the students' self-direction will have increased.

The final goal, to improve student performance of on-task duties, was satisfied as a result of the implementation of the aforementioned strategies. Students who enjoyed math lessons, had ample opportunities to participate in activities, had an improved understanding of concepts, could relate math to practical situations, and experienced success, praise, and encouragement, were more willing to participate in math lessons. Students would, therefore, improve

performance of the on task duties which are necessary for math skill development.

In summary, the primary department of the writer's school recognized the need for improved student performance in math. However, because of the lack of manipulatives and time, the students were not offered the necessary opportunities to become involved learners. Students did not understand math concepts and became frustrated and inattentive during math lessons. One cause of this was that math was an isolated area of study rather than one which was integrated into daily living situations in which the student could relate and apply skills. Therefore, the writer proposed to improve the performance of second grade students by increasing their interest and application of skills. This developed a sound math program which ensured the interest and success of students.

Report of Action Taken

The solution used in this practicum involved the second grade students in the writer's E.C.I.A., self-contained classroom. These students have been identified as low achievers based upon results of the most recent Iowa Test of Basic Skills (I.T.B.S.). First grade teachers also had imput into the placement of

students into second grade classrooms. The 13 students were at least one year below grade level in reading and/or math and ranged no higher than Stanine 2 in either subject.

The solution strategy began with preliminary actions during the first week of implementation. These actions included a conference with administrators and the parent volunteer. The conference with the administrators was held so that they would be aware of and become involved in the selected strategies by visiting the classroom often and offering praise and encouragement to the students. The parent volunteer was given information on ways she could help the classroom activities run smoothly and, also, on how to complete the Student Activities Checklist (see Appendix H).

Two problems surfaced within the first week of implementation. During the conference with the principal and assistant principal, the writer was informed about the Math Outcomes. Math Outcomes are four tests to be given every ten weeks following the teaching of specific objectives in four different areas of instuction. These tests, which were state mandated, were to be given in every grade level. Upon receiving the teacher manual, the writer immediately checked to learn what study areas were to be taught for the first

ten weeks, and how these study areas differed from those chosen for this practicum. The writer's areas of instruction differed in that they actually included areas which would be tested during the first two marking periods.

The second encumbrance, involving the Math Outcomes, was that every student was expected to exhibit 80% mastery in each area of instruction. Tests were to be administered according to the student's grade in school, regardless of the actual instructional level, as determined by the most recent I.T.B.S. scores. The writer was aware that students would have to be knowledgeable of correct mathematical terms, recognize these terms, and have enough self-direction to know what processes each term entailed in order to be successful on these tests. Terms, such as addends, sum, difference, how many more, and altogether would become part of the sight vocabulary for the second grade students who were still non-readers. These terms would be used daily in short story problems written on the board, read orally, and discussed by the group. The terms were underlined and identified as clue words to the correct mathematical process. The terms would also be used during the math activities.

Other preliminary actions taken during the first

week of implementation included setting up the learning center, examination and evaluation of supplemental workbooks, and the display of the instructional bulletin board. The instructional bulletin board for simple addition, subtraction, and money displayed math facts, pictures of the various coins and dollars, and mathematical terms, such as the ones mentioned previously. The board was divided into thirds. The first third of the board had a child climbing a ladder with the caption "How High Can You Climb?" Simple addition and subtraction facts were written next to each rung of the ladder with the answers covered by a flap of construction paper. Students could solve the problem, then quickly check for the correct answer. The second part of the bulletin board displayed various coins and dollar bills and the caption "How Much Am I Worth?" Students were to match the coin or bill to the amount by pinning pieces of yarn to the correct value. The names of the coins were displayed under each. The last part of the bulletin board displayed mathematical terms and signs. The caption was "What Do I Do?" Students were to read the term or identify the sign, then flip the piece of construction parer to reveal the correct process.

The next preliminary actions during the first week

of implementation were the administering of the Student Interest Survey, Student Questionnaire, and the Survey of Student's Self-Direction (see Appendices B, D, and F), the compilation of data, and a classroom discussion of how math is used in everyday situations. The purpose of the Student Interest Survey was to determine the students interest in math. The Student Questionnaire measured the student's understanding of the importance of math in relationship to everyday experiences. The Survey of Student's Self-Direction measured the independence of the student. Each survey and questionnaire was given individually to the students by the writer, who then recorded the answers. This method was chosen because of the low reading and writing capabilities of the students.

The final preliminary action was a teacher-led discussion centering on the importance of math. Each area of instruction, addition and subtraction, money, measurement, distance, and time was related to everyday experiences. This discussion was conversational rather than lecture oriented. Students willingly volunteered examples of how each concept was used in their daily lives once the discussion was started. These examples were then written on a chart and displayed in the room. The students were informed of the first area of

instruction and how the examples on the chart would relate to the chosen activities.

Upon completion of the preliminary actions, the second phase of implementation, the actual study of math skills and the application of these skills to everyday experiences, was begun. The Student Activities Checklist (see Appendix H) was kept for each student from this point throughout the implementation period. The first areas of instruction were addition, subtraction, and the study of money. Instruction began with a discussion of why each area of instruction was important and situations which required these particular skills. Students reviewed the examples of application written on the chart, and were told what the activities would include.

The first example of applicability for addition and subtraction was number recognition. A huge number chart was displayed and students counted from 1 to 100. This was done in oral drill fashion at the beginning of each math class. A different student was selected each day to be the leader. The responsibilities of the leader included pointing to the numbers on the chart sequentially and then to numbers at random. The class eventually learned to count by two's, five's and ten's. Worksheets accompanying this activity included number

charts with different numbers left blank. The students were required to fill in the blanks. Each worksheet was different. This activity aided the students in counting, number recognition, and number sequence. Other worksheets contained four groups of five numbers, written horizontally, and out of order. Students were required to write the numbers sequentially. These worksheets were done in small groups. Upon completion of each worksheet, a student from each group explained how and why the numbers had to be written a certain way. Students used the number chart in their explanations. This activity was beneficial because it was done in small groups. Students gained knowledge and information from their peers and realized that those who volunteered or chose to give explanations were given encouragement, praise, and positive reinforcement, rather than riducule. This was the first strategy to ensure the students' sense of belonging and self-worth.

The second example of applicability for addition and subtraction was shopping. Students discussed how they had to use these skills when they went to the candy store. This example made it necessary to incorporate the study of money. To begin, the writer visited two neighborhood stores to explain the classroom activities and to receive permission for her students to visit.

Next, the writer received written permission from the district office to take a walking trip. Parent volunteers were contacted. At this time, the writer chose to walk one mile with her students. This activity was not originally planned at this stage of the implementation period. However, because of inevitable circumstances (a prolonged teachers' strike and the approaching of inclement weather), it was deemed necessary to include the mile walk at this time. Finally, the students were informed of the trip and were asked to estimate the distance of one mile. These estimations were recorded on chart paper, but the students were not told whether or not their answers were correct.

On the day of the walking trip, students were reminded of the purpose. As they reached each corner, they counted the number of blocks they had walked. When they reached the number eight, they were informed that they had just completed a one mile walk of eight blocks.

On the return walk to school, students visited the two neighborhood stores. A discussion was held in each store as to how it was arranged, and how prices for items were labeled. Students were reminded of the importance of number recognition in this situation and

the importance of addition, subtraction, and coin and dollar recognition.

An experience story about the one mile walk was written as a culminating activity . Students eagerly volunteered information for the completion and display of this story.

To begin the actual study of money, the writer provided each student with toy money including coins and dollars. The coins were studied individually and the value of each was discussed. The same was done for the dollar bills.

The second grade students recognized and named the coins and dollar bills with no difficulty. Emphasis, therefore, was shifted to coin value. Activities included interchanging given coins (nickels, dimes quarters, fifty-cent pieces) with smaller coins totaling the same value (five pennies for one nickel, two nickels/10 pennies/one nickel and five pennies for one dime,etc.). Coin values were constantly reinforced, examples were plentiful, counters, play money and the number chart were used. This activity proved to be difficult for most of the students. Though they could add and subtract the value of coins, they could not interhange coins beyond a dime. Rather than confuse and frustrate the students, the writer concentrated on the

addition and subtraction of money.

At this time, a toy store was set up in the room. Items for sale included masks, pencils, dolls, boats, coloring sheets, ribbons, barrettes and combs, plastic soldiers, plastic animals, erasers, candy, and crayons. Items ranged in price from one cent to a quarter. Letters were sent to parents describing the classroom store, explaining its purpose, and asking for their cooperation by allowing their child to bring at least a penny to school occasionally. The store was opened at the end of each math period. Each student was given the opportunity to be store owner. However, responsibilities were carried along with this privilege. The store owner set up the store, arranged the prices on the items, and was responsible for totaling the amount of each purchase, receiving money, and administering the correct change. A calculator cash register was used as a check for accuracy. The writer supervised this activity and asked such questions as "Does the customer have enough money?" "Does the customer have more than is needed, or less than is needed?" "How much was spent altogether?" "What is the sum?" "Will the customer receive change?" "How much money does the customer have left?" "What is the difference in the amount of money given and the actual amount spent?" These questions

were asked as a means to incorporate the terms which would be included in the Math Outcomes and to allow students to hear and apply the terms to practical skills.

The store was a success. Students asked about the store upon entering the classroom each morning. Three teachers set up stores in their own classrooms and students, in rooms that did not have stores, asked to come to the writer's. This activity proved to be a learning experience for the writer's students as well as teachers and students within the building. Because of the success of this activity, the classroom store is a continuing activity.

A second activity was that of planning a menu. This was a small group activity. The class was divided into three groups and each group was responsible for planning a menu for either breakfast, lunch, or dinner. The groups were allowed time for discussion. Following this time, the three menus were written on the board. The students were next told to estimate the cost of the menu. These estimates were written on a chart and displayed in the room. Students were then given ads from a teacher-made food section and a blank sheet of construction paper. They were required to cut the food items and costs for their particular meal from the ad,

paste them onto the construction paper, color the items, and total the cost. This activity demanded close supervision and help from the writer. The costs had to be rewritten, vertically, because students were more comfortable with this presentation. Although the students could add two and three digit numbers, they had not yet been introduced to regrouping. Therefore, the writer briefly explained to each group the reason for regrouping and how it was done, while totaling the cost for each meal. Next, the actual cost was written next to each students's estimate. The students had to tell whether or not their estimate was greater or less than the actual amount . This information was written on the chart using both the words and symbols. The students were amazed at the comparisons. Although this activity did not include finding the exact difference in the estimate and actual cost, the students made comments if the estimates were to the extreme.

The final activity for the application of addition, subtraction, and money skills was setting up a classroom bank. The writer began this activity by reading and discussing a story about banks. The terms deposit, withdrawal, and balance were explained, a sample bank book was passed around for each student to study, and a large, teacher-made deposit/withdrawal/balance sheet was

displayed..The students were told that a deposit of one toy dollar would be made at the end of each day if they remained attentive and performed the assigned duties. Withdrawals, of one or two dollars, were made each Thursday for the purchase of treats. Balancing the account each day was a class activity. The students became more enthusiastic about the classroom bank as they saw the toy dollars accumulate. Students who became inattentive or lackadaisical in their performance were quickly enouraged to cooperate by the other students. Requests for special art supplies, not provided by the school, were numerous. Students began to realize that saving was important and that saving towards a special goal was fun. This activity is ongoing.

The third study area was measurement. This study area included liquid and dry measurement and measurement using inches and centimemters. An instructional bulletin board was displayed. This bulletin board, entitled "How Many Equals One Gallon" showed pictures of a cup, pint, quart, and half-gallon. Students were to write answers on laminated sheets next to each picture, then check for correct answers by looking at a chart. The second half of the bulletin board, entitled "Can You Do This" had two pockets containing rulers and

centimeter sticks. Specific items for measurement were written and pictured on the board. Beside each item was a sheet of paper with the words inches and centimeters written on it. Students were to locate the items in the room, measure, then record their findings onto the sheet of paper.

To begin the actual study of measurement, students were reminded about different situations in which measurements were used. These situations were cooking, sewing, drawing, and building. The chart, with these situations, was reviewed and activities were explained.

The first activity was one of exploration and discovery. The different measuring devices for liquid and dry measurement were identified and labeled. Students were then divided into four groups; each goup was provided with a bucket of water and containers. Time was allocated for students to explore. Students were next asked to determine how many of the following: teaspoons in a tablespoon, cups in a pint, pints in a quart, etc. Answers were recorded following each discovery. Worksheets included ones in which students were to match these equivalents.

Students were to use the skill of measuring and apply it to the practical experience of cooking. A recipe for chocolate chip cookies was written on the

board, followed by a discussion of the necessary ingredients. Each student measured an ingredient, while the others responded as to whether the measurement was or was not correct. The principal and assistant principal were invited to participate in this activity. The students explained what they were doing and the purpose of the activity. The cookies were then baked and eaten at school. An experience story as well as individual compositions were written as result of this activity.

The second part of this project involved measuring in inches and centimeters Once again, time was allotted for exploration and discovery. Students were asked to draw a line an inch in length. They were then given a one inch piece of paper and asked to compare their estimate to the actual length. Students were then provided with rulers and given time to discover how many inches are equal to one foot. Next, students were given a yardstick and were told to find how many inches and feet were equivalent to one yard. Information was recorded after each discovery. Finally, students were given a list of different objects to measure and asked which tool of measurement was more appropriate to use. Worksheets for the activity involved comparisons of units of measurement, pictures of objects for students

to measure in inches and centimeters, and directions on how to draw shapes of specific sizes.

Activities for the application of skills for this study area included sewing, drawing and building. The writer provided two yards of material which were measured using rulers and yardsticks. Tape measurers were provided to the girls for the measurement of their waists and hips. These measurements were recorded on the board. The boys measured the length of their legs, upper bodies, and arms. These measurements were also recorded. While the girls remeasured and cut the material in preparation for sewing, the boys began to draw their replicas on butcher paper. Once the boys' project was underway, the girls were individually supervised in the sewing of the seams and hems for their skirts. The writer completed each skirt with an elastic waistband. As a culminating activity for these two projects, the girls modeled their new skirts in each classroom and the boys exhibited their artwork. Two students, a girl and boy, were selected to explain the purpose of the activitity and how it was accomplished.

The final activity for the application of measurement skills was building. Students were read a short story about a carpenter who used measurements to draw blueprints and cut wood for a house. Students were

given a blueprint to study and discuss. Students were then told that this blueprint would be be used to make a large keyholder to be hung on the wall. Plywood, a small hammer and saw, nails, and paints were provided by the writer. Students were given specific measurements for the plywood (six inches in length, three inches in width) and specific locations for the nails (one inch intervals). Though students were given instructions and demonstrations on the proper use of the tools, they were very closely supervised during this project. The class was then divided into groups . The first group measured and marked the length of the wood. The second group measured and marked the width of the wood. The third group marked the location for two rows of nails at one inch intervals. All students had an opportunity to saw the wood, hammer in a nail, and paint the keyholder. The finished project was put on display in the room. The clasroom key and pass are hung there daily.

Preparation for the fourth study area, time, involved making an instructional bulletin board. This board had many pictures of different types of clocks with various times and the caption "A Sign Of The Times." Students were to match the hands on the clocks with the correct times and school activities.

Next, the students discussed how time played an

important role in their daily routine. The chart "How Do We Use Math In Everyday Situations?" was reviewed.

The final preparation was the presentation of the lessons on time. A large clock was used to demonstrate and explain the function of the minute and hour hands. Students were told that the minute hand moved a total of 60 times before the hour hand moved from one number to the next. Students were given individual clocks with movable hands so that they could count off the minutes while moving the minute hand. Students identified and marked numbers which corresponded to 5, 10, 15 minutes, etc., on their clocks. Students next divided the clocks into quarters and were given the reason for doing so. Worksheets for these lessons included telling time to the hour, quarter hour, and half hour. Students either drew in the hands on clocks for specific times or wrote the times for given clocks.

The first activity in which students could apply their skills was a game. The first student to announce the correct time to the class was awarded a treat. This activity was done every hour, and, eventually, every half hour. Although this activity was enjoyable, it should be used with caution. It was not the intention of the writer to have the students become clockwatchers, but to recognize and tell time to the hour and half

hour.

The next activity required the students to complete six given clocks and write the times for specific activities. The activities were: waking up, beginning school, eating lunch, leaving school, eating dinner, and going to bed. Each worksheet was displayed in the room upon completion.

The third and final activity was a discussion of favorite television shows. Letters were sent to parents asking for their assistance each day for one week. Worksheets, entitled "My Favorite Programs," with the days of the week written across it, a clock for each day, and two blank lines under each clock were sent home. Parents and students were to discuss the favorite program for each day, fill in the hands on the clock depicting the time the program was aired, write the time, and name the program. Papers were returned the following week. Students discussed their favorite programs and checked their papers with others to ensure that clocks and times were correctly drawn and written.

The final study area, chosen by the writer for this practicum, was distance. Students were reminded of their walk and the number of blocks in a mile. The experience story was reread. The chart with their estimations of the distance of a mile (completed during

the first weeks of implementation) was presented. Students were amused as the chart was discussed and commented on how far the estimations were off.

Two activities in which the students could apply their knowledge were performed. The first activity was to record the difference of each estimate and the actual distance. Students had to explain if the estimate was greater or less than a mile. This information was then recorded on the same chart.

The second activity was to count the number of blocks each student walked from school to home. This information was recorded for each student and compared to the distance of a mile using the terms and symbols for greater or less than.

The final phase of the program was evaluation. The first activity, the Student Interest Survey, reassessed the students' interest. The second activity, the Student Questionnaire, reassessed the students' knowledge of how math skills are applied in everyday experiences. The results of this questionnaire are presented in Appendix E. The third activity measured the students' self-direction. Results were compared to those from the pre-implementation administration (see Appendix G). The final activity measured the students' participation in each activity (see Appendix H).

Chapter V

Results, Conclusions, and Recommendations

Results

Objective One was measured by a teacher-made survey. This survey may be found in Appendix C. The objective, "Over a period of 12 weeks, second grade students will increase their interest in math as measured by a 10% increase in the average score of the class on a teacher-made interest survey to be given at the beginning and end of the implementation period," was met with an actual increase of 36%. The 10% level was originally chosen for this objective because of the students' history of low level achievement. As explained previously, the second grade students were at least one year below grade level and ranged no higher than Stanine 2 on the most recently given I.T.B.S. It is difficult to motivate and maintain the interest of students who have no basic understanding of math and have consistently met failure. However, this practicum has proven that students, who are involved in activities in which their skills can be applied to practical experiences, improve their understanding and, thereby, increase their interest.

One positive result of the math program was that

students often asked that the math period be extended or for extra worksheets. Another positive result was that seven of the thirteen students, who liked math only a little or not at all before the program was implemented, liked it very much by the end of the 12 weeks. Seven students also responded that they felt their math work was too easy, as compared to being too difficult before the program's implementation.

Objective Two was measured by a teacher-made student questionnaire. The specific objective, "Over a period of 12 weeks, second grade students will relate math to everyday experiences as measured by writing 15 of 20 examples on a teacher-made questionnaire to be given at the beginning and end of the implementation period," was met by twelve of the thirteen students. Comparisons of the results from pre- and post-implementation are found in Appendix E.

Objective Three measured students' self-direction. A teacher-made survey was given at the beginning and end of the implemenation period. This survey was composed of 14 observations in the the following areas: student preparation, knowledge of daily routine and format of worksheets, student's ability to work individually and in small groups, accurate choice and use of manipulatives, knowledge of procedures for solving

problems, and ability to complete assignments and occupy time in a productive manner.

The specific objective, "Over a period of 12 weeks, second grade students will develop self-direction as measured by a 10% increase in the average score of the class on a teacher-made survey to be given at the beginning and end of the implementation period," was met with an increase of 38 %. Results of this survey are found in Appendix G.

A positive result of the increase in students' self-direction was seen in their performance on the Math Outcomes Tests. As explained in Chapter IV, the Math Outcomes Tests are four state mandated tests, given every ten weeks. These tests are given according to students' grade level rather than instructional level. Of the writer's 13 students, four obtained mastery on all outcomes tests, six obtained mastery on three of the four tests, and one student each mastered two outcomes, one outcome, or was absent during the testing period. These results are impressive when one considers the ability levels of the students.

The final objective, Objective Four, measured students' participation in the activities chosen for each study area. The specific objective, "Over a period of 12 weeks, 75% of the second grade students will

participate in 20 of the 25 math activities as measured by a teacher-made activities checklist," was met by all of the students. This was possible because the majority of the activities, with the exception of the walking trip and baking experiences, were repeated throughout the duration of each particular study. Many activities (figure drawing, sewing, building, depicting time of favorite television shows) were continued over a period of two to seven days. Because students were made to feel more positive of themselves, and were encouraged, praised, and assisted, they eagerly volunteered information for the completion of charts and experience stories. Students volunteered to help others and explain how they derived certain answers, what steps were taken, and the reasons for employing those procedures.

Conclusions

The first objective concerned student interest. This objective, as evidenced by the data presented in the previous section, was met well within the established guidelines. Methods used to increase student interest included the alteration of teacher preparation of lessons and teaching strategies, environmental control, positive reinforcement, and

parent involvement.

The first method, alteration of teacher preparation of lessons and teaching strategies required the writer to become very well organized, moving smoothly from one strategy to the next. This method also necessitated the writer to analyze and evaluate tasks in order to select those which were most interesting, relevant, appropriate and varied.

The results of this method support the findings of Davidson (1980), McNamara (1981), Seifert and Beck (1984), and McDaniel (1986). Davidson believed that waiting time could negatively effect students, causing boredom and anxiety. McNamara believed in the need for teachers to focus on the content of instruction. Work should be matched to students' capabilities to maintain a high level of interest. Seifert and Beck believed that students should be involved in learning from the beginning of class. They further believed that in order to keep student interest, instructional strategies should change three to four times in one period. McDaniel stated that teachers must deal with such dysfunctional behavioral manisfestations as frustration, discouragement, and apathy. He believed that the quality of a teacher's instructional practices rests on the ability to convince young people that school is

important and the ability to make long-term relationships with the students. The success experienced by the writer verified the findings of these authors.

The second method to increase student interest was environmental control. Environmental control is the manipulation of the classroom environment to stimulate and improve learning. One way in which the writer controlled the environment was through the use of instructional bulletin boards for each area of study. These instructional bulletin boards were self-correcting and served as a means for the students to practice skills and get immediate feedback. Self-correcting worksheets were also used for this purpose.

A second way in which the writer controlled the environment was through the use of a math center. This math center, occupying one corner of the room, contained various manipulatives for the students. These manipulatives included clocks, rulers, centimeter sticks, counters, an abacus, spoons, cups, pint, quart, half-gallon and gallon containers, play money, a cash register, tape recorder and tapes. Manipulatives were used to arouse the curiosity and interest of students as well as to provide concrete objects to aid students' understanding of concepts.

Control of the environment proved to be a successful strategy. However, the writer agrees with McDaniel (1986) who foresaw the possibility of overstimulation. McDaniel suggested the use of quiet corners with instructional bulletin boards and self-correcting worksheets in addition to the activity centers.

The third method to increase student interest was through positive reinforcements. Students were encouraged, praised, and rewarded constantly. Nods, smiles, and gentle pats, as suggested by Calvin et al. (1986), McDaniel (1986), and Punnet (1986), encouraged and motivated the students. The writer gave oral praise at every given opportunity. Students were praised for volunteering information, staying on task, working well in groups or individually, peer tutoring, completion of work, proper use and care of manipulatives, etc. Praise developed the students' sense of self-worth and belonging. Rewards were also given to students. These rewards included stickers, candy, rings, coloring sheets, crayons, toys, jewelry, treats each Friday afternoon, and smile-o-grams. Positive reinforcements proved to be an effective, inexpensive strategy to employ in the classroom.

The final method, employed by the writer to improve student interest, was parent involvement. Parents were

notified of class activities through newsletters and smile-o-grams. Newsletters, sent at the beginning of each area of study, informed parents of the concepts being taught and the related activities. Parents were asked for their cooperation by praising students and discussing daily activities. They were also invited to participate in the school activities. Smile-o-grams, praising student performance, were sent home to inform parents of student progress and accomplishments.

The methods employed to involve parents were adapted from the home-based reinforcement program of Witt and Hanafin (1983). These authors found that students increased interest and raised their levels of academic performance when parents offered praise, privileges, and encouragement. The success experienced by the writer verified this finding.

One unanticipated outcome demonstrating increased student interest was the request for extended math time and extra worksheets. The writer expected that students would ask for extended math time, especially during exploration/discovery periods and special projects, but was pleasantly surprised by the request for additional worksheets. The implication of this was that students became increasingly motivated by their own success.

A second unanticipated outcome was the response to

the question "Do you think your math work is: too easy, just right, or too hard?" Seven of the thirteen students responded that the work was too easy, as opposed to the response of too hard before the program's implementation. The implication of this was that students understood math concepts and knew why they were performing specific procedures.

The second objective of this practicum addresed students' ability to relate math to everyday experiences. This objective was met as evidenced by the data presented in the previous section. Two approaches were used to enable students to relate math to everyday experiences and apply their skills in those situations. The first approach, suggested by Arlin (1979) and Davidson (1980), was to inform the students of the goal of instruction and of what they would be doing. Arlin and Davidson believed that students who were informed of the goal and activities had a better understanding of why they were performing certain tasks. The writer began each math period with this approach.

The second approach, suggested by Simon (1986), was exploration/discovery and pair and small group problem solving. Students were allowed time at the beginning of each study area for exploration. Manipulatives were provided for individuals or groups of students. After

the time for free exploration, students were given specific problems to solve. This approach was enjoyed by all the students. The writer believes that students who are actively involved in problem solving have a better understanding of concepts, and are able to apply skills to new situations.

The third objective, concerning students' self-direction, was met within the guidelines as evidenced by the data presented in the previous section. Yatvin (1980) found that students who were effective managers of time, were absorbed in high level tasks and were willing to stay with them. Students also made independent decisions and worked through problems to a successful conclusion. Yatvin endorsed individual study programs in which students made their own work schedules.

Wang (1979) believed that students should be managers of their own time and responsible for scheduling their time to complete assigned tasks and additional learning activities of their choice. The writer believed that students should be effective managers of their time, but, more importantly, they should become confident, independent, self-directed learners. The writer further believed that too much freedom was detrimental to this process. Therefore, the

strategies of Yatvin and Wang were revised. Tasks were assigned with given time constraints. A daily routine was established. Students were told what they would be doing and why. Formats of worksheets and tests were consistent so students could begin work without asking questions. Students were taught what manipulatives to use and how to use them. Students were encouraged to ask questions or for assistance. They were guided through each step of the problem with explanations as to how and why each step was performed. This strategy was suggested by Burns (1986) who believed that students who were told what to do and why, increased their understanding and could more easily apply skills to new tasks. Finally, students were taught how to pursue appropriate activities, when time permitted.

An unanticipated outcome resulting from these strategies was student performance on the state mandated Math Outcomes Tests. Though reading of the tests posed a problem to all of the students, 10 of the 13 students were able to identify key words and perform the related operations. These 10 students passed either all four of the tests or three of the four tests. This performance was an implication that the majority of the students were able to transfer skills and apply them to new situations.

The final objective concerned student participation in given activities. This objective, met by all of the students, was dependent upon the first three objectives. Selected activities were appropriate, interesting, and varied. Students were give ample opportunities to participate in all activities, with the exception of two: the walking trip and baking experience. All other activities were repeated throughout the particular study area, or were continued over a period of time. The fact that this objective was met by all students implies that the students felt more positive about themselves, and their knowledge of math.

In conclusion, this practicum project proved that a math program which employs strategies to increase students' interest, ability to relate math to everyday experiences, and self-direction, will also improve student participation in the math duties which are necessary for math skill development. The writer is pleased with the results obtained from this practicum and intends to use and expand upon the strategies throughout the coming years. This math program will help ensure that students have a basic understanding of math concepts and skills which will help them gain success throughout their school years. The program will also help ensure success in their adult years, as it

becomes more and more necessary to apply these skills to everyday situations.

Recommendations

The writer has six specific recommendations based on the results of this practicum. First, the math teacher should analyze and evaluate materials and tasks to make sure they are appropriate for the students. This will motivate students to engage in them. Second, the math teacher should use concrete objects when introducing concepts. All students, no matter the age, have a better comprehension when they can manipulate objects. Third, math lessons should be abundant in examples. This gives students many opportunities in which they can relate concepts and skills. Fourth, activities should be varied. This will prevent students from becoming bored and frustrated. It will also provide ample opportunities for the students to become involved in learning. Fifth, the math teacher should provide different approaches to problem solving. This is a fun way for students to learn. It also allows students to recognize their own thought processes and those of others. Finally, the math teacher must be able to express enthusiasm about the math lessons and encourage the students' enthusiasm.

The writer believes that students can be successful in math. It is the responsibility of all math teachers to capture and maintain interest, provide countless activities in which students can be successful, and, finally, make students so excited about math that they will strive for more.

Dissemination

The results of this practicum will be shared in the following ways. First, the practicum will be submitted to the school's principal and assistant principals. Second, the practicum will be submitted to the E.C.I.A. coordinators from the district and central offices. Third, results of this practicum will be submitted to the Board of Education's Math Bureau in charge of curriculum planning.

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Appendix A

Results of Teacher Survey

Teacher Survey

1. The reason(s) students are inattentive during math is (are):

Responses	Number out of 25
Students lack understanding of basic skills	9
Students lack interest	7
Students can not relate math to anything	5
Math is not presented in a fun way	2
Students do not like math	1
Students are not physically involved	1

2. How often do you provide hands-on experiences to help teach math concepts?

Responses	Number out of 12
Daily	7
Once a week	2
Three times a week	1
Only during the first 10 weeks of school	1
Twice a week	1

3. What are the difficulties in providing hands-on experiences?

Responses	Number out of 34
Lack of manipulatives	8
Lack of time	5

Outside interruptions	5
Class size	4
Manipulatives too easily lost or destroyed	4
Necessity for individualized instruction on their use	2
Discipline problems	2
Not using manipulatives for their intended purposes	2
Dependency on manipulatives	2

4. List the manipulatives you now have in your classroom to demonstrate math concepts.

Responses	Number out of 12
Counters	12
Counters, abacus	6
Counters, abacus, clock	6
Rulers	4
Flash cards	2
Magnetic board	1
Felt board	1
Geometric shapes	1
Toy money	1
Cups, spoons	1
Numberlines	1

5. Do you have enough of these manipulatives for individual or small group activities (four students

to a group)?

Responses	Number out of 12
Yes - for counters	12
No - for all others	12

6. List two math skils and your methods of teaching these skills that you have found to be effective.

Skill	Method	Number
Subtraction/ Addition	Counters and Blackboard	9
Oral Drill	Put to music	1
Multiplication	Use of rays	1
Place value	Role playing	1

7. How attentive are your students in the following areas:

1. teacher presentation?

Responses	Number out of 12
Very	4
Moderately	8

2. manipulatives?

Moderately	6
Not at all	6

3. oral questions and answers?

Very	1
Moderately	8
Not at all	3

4. paper and pencil seatwork?	
Very	1
Moderately	6
Not at all	5
5. oral drill?	
Very	6
Moderately	6
6. tests?	
Very	1
Moderately	11

Appendix B

Student Interest Survey

Student's name:

Date:

Total points:

Total possible points: 21

Average score:

1. Do you like math?

very much	a little	not at all
3	2	1

2. How does math make you feel?

very happy	happy	not happy at all
3	2	1

3. Do you ask questions during math lessons?

all the time	sometimes	never
3	2	1

4. Do you like for the teacher to ask you questions about math problems?

all the time	sometimes	never
3	2	1

5. Do you think that your math work is:

too easy	just right	too hard
3	2	1

6. Do you enjoy using manipulatives?

very much	a little	not at all
3	2	1

7. Do you enjoy working at the board?

very much	a little	not at all
3	2	1

Appendix C

Results of Student Interest Survey

Student Interest Survey

Student	Pre-implementation Mean Score	Post-implementation Mean Score
1	2.428.	2.571
2	1.857	2.571
3	1.428	2.428
4	2.0	2.571
5	1.714	2.571
6	1.571	2.571
7	2.142	2.857
8	1.714	2.857
9	2.0	2.714
10	2.142	2.714
11	1.428	1.714
12	2.0	2.285
13	2.0	2.285
Class Average	1.878	2.549

Appendix D

Student's Questionnaire

How Do We Use Math In Everyday Situations?

Addition and Subtraction

1. _____
2. _____
3. _____
4. _____

Money

1. _____
2. _____
3. _____

Measurement

1. _____
2. _____
3. _____
4. _____

Distance

1. _____

Time

1. _____
2. _____
3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Appendix E

Results of Student Questionnaire

Student's Questionnaire

Number of Accurate Responses*

Student	Pre-implementation	Post-implementation
1	3	18
2	3	17
3	5	18
4	5	18
5	5	18
6	1	17
7	5	18
8	1	17
9	3	18
10	2	18
11	2	8
12	3	16
13	5	15

*20 correct answers are possible

Appendix F

Survey of Student's Self-Direction

Student's name:

Date:

Total points:

Total possible points: 70

Mean:

5 = always
4 = usually
3 = sometimes
2 = seldom
1 = never

5 4 3 2 1 1. Student knows daily routine.

5 4 3 2 1 2. Student has necessary materials for lesson.

5 4 3 2 1 3. Student knows the format for teacher-made tests and worksheets and can begin work without asking questions.

5 4 3 2 1 4. Student works individually.

5 4 3 2 1 5. Student knows what manipulatives to use for a given concept.

5 4 3 2 1 6. Student knows how to use the manipulatives.

5 4 3 2 1 7. Student uses the manipulatives freely.

5 4 3 2 1 8. Student knows what steps to take to

solve problems.

5 4 3 2 1 9. Student knows when to ask questions or ask for help.

5 4 3 2 1 10. Student completes activities.

5 4 3 2 1 11. Student works well in groups.

5 4 3 2 1 12. Student paces through written seatwork activities.

5 4 3 2 1 13. Student checks work.

5 4 3 2 1 14. Student occupies time in a productive manner if activity is completed early. (Uses manipulatives, helps others, plays with math games)

Appendix G

Results of Survey of Student's Self Direction

Survey of Student's Self Direction

Student	Pre-implementation Mean	Post-implementation Mean	% Of Change
1	3.429	4.571	33%
2	2.857	4.0	40%
3	3.286	4.357	33%
4	2.143	3.428	60%
5	3.214	4.428	38%
6	.071	.152	114%
7	3.857	4.571	19%
8	2.643	4.428	68%
9	4.0	4.785	20%
10	3.643	4.428	22%
11	1.429	2.928	105%
12	2.714	4.142	53%
13	3.357	4.428	32%
Class Average	2.819	3.896	38%

Appendix H

Results of Student Activities Checklist

Student Activities Checklist

Activities	# of Student Participation
Money	
1. Walk to the grocery store	13
2. Role-playing (customer)	13
3. Role-playing (salesperson)	13
4. Adding amount of purchase and counting change	13
5. Planning a menu	12
6. Using the manipulatives	13
7. Participation in oral discussion	13
Measurement	
1. Actual measuring	13
2. Oral participation	13
3. Bringing in recipes	6
4. Inviting parents to share in activities	13
5. Drawing shapes	13
6. Building	13
7. Sewing	5
Time	
1. Oral discussion	13
2. Participation in chart completion	13
3. Completion of clocks depicting times of specific activities	13

4.	Writing times and drawing clocks depicting favorite television show for everyday of the week	13
5.	Participation in games	13
6.	Using the manipulatives	13

Distance

1.	Walking a mile	13
2.	Counting and reporting number of blocks child must walk from home to school	13
3.	Participation in class discussion and chart completion	13
4.	Comparing distance from their home to school stating greater than or less than a mile	13
5.	Stating how much greater or less the distance is	13

Appendix I

Sample Weekly Log

Weekly Log

Week: 4

Date: November 13, 1987

Student Activities:

Students were given the opportunity to role-play. A different child was chosen each day to be salesperson; the other students were customers. Customers selected items for purchase and totaled the cost. The salesperson also totaled the cost, determined whether the costumer had enough money, or was due change. The salseperson was responsible for arranging items for sale.

Manipulatives Used:

A calculator cash register was used to aid the salesperson in addition and subtraction, as well as to make the store more realistic. When necessary, the customers substituted counters for the value of their money. The counters were easier for some students to manipulate.

Successes:

Items for sale were age appropriate for the second grade students. Items included toys, jewelry, masks, coloring sheets, crayons, pencils, erasers, candy gum, stickers, combs, and barrettes. Prices began at one cent. The store was a success because students enjoyed and could afford the items for sale.

Teacher Concerns:

The writer hoped this particular activity would be an enjoyable learning experience for the students. To ensure that students developed addition and subtraction skills, became familiar with specific terms and phrases, and could perform the related procedures, the writer closely supervised the activity and asked many questions. These questions reinforced the terms and phrases that would be presented on the Math Outcomes Tests and afforded the students the opportunity to apply the terms to practical skills.

Appendix J

Teaching Strategies

Organization

All materials for day's lesson are readily available

Students know daily routine

Formats for worksheets and tests are consistent

Lessons

Students are told what they will be doing

Specific goal is given at the beginning of the lesson

Students are actively involved at the beginning of the lesson

Presentations are abundant in examples and demonstrations

Time is provided for class discussion, reasons for studying the lesson, and its applicability

Time is given for a brief review of prior concepts, skills, previous day's homework, and/or homework

Each step of the demonstration is explained (how and why each step is performed)

Students are encouraged to respond to problems as a group or individually

Students are given time to work in groups or individually

Students are given time for exploration and discovery

Students are given time for questions and answers or further demonstrations to clarify the lesson

Materials

Teacher uses concrete materials to demonstrate

Teacher provides students with concrete materials

Teacher uses instructionl bulletin boards

Motivation

Teacher makes the environment pleasant

Teacher raises the interest level of students by making learning more meaningful

Teacher provides many opportunities for success

Teacher offers positive reinforcement

Teacher invites parents to participate in activities and encourage their children

Teacher uses bulletin boards that are attractive and instructional